Space Weather Forecast

Issued on Monday, 29 July 2024 at 13:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Coronal Mass Ejection arrivals expected day 1 or early day 2 (29-30 Jul), and then again day 3 into day 4 (31 Jul-01 Aug). G1-G2 / Minor to Moderate Storms, with a chance G3 Strong Storms. Moderate to High solar activity.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High with a short-lived Strong-flare (X-class) at 29/0237 UTC from the centre most of the cluster of sunspots in the south-centre disc. This is a collection of moderately sized but complex sunspots, with some growth observed, especially in the southernmost spots of the region. There are also two moderately sized and slightly magnetically complicated regions in the southwest disc, which have been the source of both coronal mass ejections (CMEs) and Moderate flaring. A further region has also continued to develop in the north-centre disc, and increasing in complexity. There are a total of ten regions currently on the disc.

A number of CMEs were observed, with one from off the southwest-disc assessed as being Earth-directed. This has been attributed to a combination of a couple of Moderate-class flares.

Solar Wind / Geomagnetic Activity: Solar winds were at background, with speeds declining slightly from around 400 km/s to near 350 km/s. Interplanetary magnetic field, Bt, was weak, with north-south component also weak and variable. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High activity is expected with further Moderate class flares expected and chance of isolated Strong-class flares.

Solar Wind /Geomagnetic Activity: A number of CMEs are expected to arrive through the period. The first is expected later on day 1 or early day 2 (29-30 Jul), originating from a Moderate-class flare on 27 Jul. The CMEs from the Moderate flare early on 28 Jul, and then the further Moderate flares later on 28 Jul are then expected to arrive late day 2 or day 3 (30-31 Jul), perhaps combining into a single arrival, although this is currently low confidence. Overall, initially Quiet conditions are likely to increase to G1-G2 Minor Storm with any CME arrival with a slight chance of G3 Strong storms.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to rise above background at times in response to any notable flaring that occurs. This will bring a slight chance of exceeding the S1 Minor Solar Radiation Storm level.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	60	60	60
Strong	G3	No	20	20	15	5
Severe	G4	No	5	5	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	Yes	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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